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QUAL2E Windows Interface User's Guide

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United States Environmental Protection Agency
Office of Water
Office of Science and Technology
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FOREWORD

Water quality standards are implemented through a process of calculating Waste Load Allocations (WLAs) and/or Total Maximum Daily Loads (TMDLs). Ultimately Permit Limits are developed based on the calculated WLAs and TMDLs. Many of these required calculations are preformed with computer simulation models. Either steady-state or dynamic modeling techniques may be used.

The Office of Science and Technology develops and maintains analytical tools to assist in performing analysis of water quality problems. The Windows interface developed for the QUAL2E model will help users prepare input files more efficiently. Default values for constants are included in the interface to provide reasonable numbers with which to begin the modeling. Integrated data manipulation options, stream network graphics, and plotting capabilities are among the many useful features included in the QUAL2E Windows interface. Different screens or parts of screens will be active or inactive depending on the input. This feature reduces the potential for making mistakes during data entry.

This document is an Agency software user's manual. It does not establish or affect legal rights or obligations. It does not establish binding requirements. This document is expected to be revised periodically to reflect changes in this rapidly evolving area. Comments from users will be welcomed. Send comments to U.S. EPA, Office of Water, Office of Science and Technology, Standards and Applied Science Division (4305), 401 M Street SW, Washington, DC 20460.

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DISCLAIMER

The information contained in this user's manual is intended to assist in using the Windows™ interface for the QUAL2E model, developed by the U.S. Environmental Protection Agency's Office of Science and Technology. This user's manual is not a substitute for *The Enhanced Stream Water Quality Models QUAL2E and QUAL2E-UNCAS: Documentation and User Manual* developed by Thomas O. Barnwell, Jr. and Linfield C. Brown (EPA/600/3-87/007) which addresses the model theory, and provides more specific guidance on applications.

TRADEMARKS

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1.INTRODUCTION

The Enhanced Stream Water Quality Model (QUAL2E) is a comprehensive and versatile stream water quality model. It can simulate up to 15 water quality constituents in any combination desired by the user (Brown and Barnwell, 1987). The model is applicable to dendritic streams that are well mixed. It uses a finite-difference solution of the advective-dispersive mass transport and reaction equations. The model is intended for use as a water quality planning tool.

QUAL2E-UNCAS is an enhancement to QUAL2E that allows the user to perform uncertainty analysis. Three uncertainty options are employed in QUAL2E-UNCAS: sensitivity analysis, first order error analysis, and Monte Carlo simulation.

The QUAL2E Windows™ interface was developed to assist the user in data input and model execution and to make a complex model user-friendly. The Windows interface was developed for the U.S. Environmental Protection Agency's Office of Science and Technology, Standards and Applied Science Division, to help the Division implement the Total Maximum Daily Load (TMDL) program. This user's guide provides instructions on the use of the QUAL2E interface and illustrates its use with three example runs. The Windows interface integrates the QUAL2E model and data handling needs to make the model implementation user-friendly. A brief description of the QUAL2E model structure is presented to facilitate subsequent discussions.

This guide is divided into six sections. Section 2 provides a technical summary of the QUAL2E model, as well as the model structure, the input requirements, and the output. Section 3 describes the Windows implementation of the QUAL2E model, including descriptions of the screen sequences, changes made for ease of use, and limitations of the implementation. Section 4 provides minimum requirements and instructions for installing the software. Section 5 provides the information necessary to use the QUAL2E interface, including:

- Accessing an Existing File or Opening a New File
- File-Naming Conventions
- Saving Input Files
- Setting Up a Default Editor for Viewing Output Files
- Submitting an Input File to the Model
- QUAL2E Windows Interface Commands and Function Keys
- Import File Option in QUAL2E
- How to Use the Graphics Routine
- Array Screen Capabilities in QUAL2E
- Unit Conversion

Section 6 contains three example runs that highlight user entry and model output. Appendix A provides the screen structure and descriptions of the variables for the Windows interface.